

AMENDED CLAIMS SHOWING THE AMENDMENTS

1. (Amended) System for the automatic analysis of images [(I)], such as images of DNA microarrays after hybridisation, said images [(I)] comprising a matrix of points or spots, the system being adapted to be associated with a sensor [(10)] for acquiring said images [(I)] and comprising a circuit [(20)] for processing the signals corresponding to said images [(I)] generated by said sensor [(10)], [characterised in that] wherein said processing circuit [(20)] is configured according to a cellular neural network (CNN) architecture for the parallel analogue processing of said image signals.

2. (Amended) System according to claim 1, [characterised in that] wherein said sensor [(10)] is configured to acquire, as said images [(I)], fluorescence images from DNA microarrays.

3. (Amended) System according to [any of claims 1 or 2] claim 1, [characterised in that] wherein said cellular neural network architecture comprises matrix of cells [(100)] locally interconnected by means of synaptic connections, said matrix presenting a spatial distribution which is essentially correlated to the matrix form of said images [(I)].

4. (Amended) System according to claim 1, [characterised in that] wherein said sensor [(10)] is a matrix optical sensor.

5. (Amended) System according to [any of claims 1 or 4] claim 1, [characterised in that] wherein said sensor [(10)] is a colour optical sensor.

6. (Amended) System according to [any of claims 1, 4 or 5] claim 1, [characterised in that] wherein said sensor [(10)] is an optical sensor which is selectively sensitive to distinct chromatic components [(R, G, B)] of said images [(I)].

7. (Amended) System according to claim 6, [characterised in that] wherein said processing circuit [(20)] is configured to process signals corresponding only to some [(R, G)] of said distinct chromatic components [(R, G, B)] of said images [(I)].

8. (Amended) System according to claim 7, [characterised in that] wherein said processing circuit [(20)] is configured to process signals associated only to distinct chromatic components [(R, G)] of said images [(I)] with the exclusion of the blue chromatic component [(B)].

9. (Amended) System according to [any of claims 6 to 8] claim 1, [characterised in that] wherein said processing circuit [(20)] is configured for processing the signals corresponding to said distinct chromatic components [(R, G)] of said images [(I)] in parallel.

10. (Amended) System according to [any of the preceding claims] claim 1, [characterised in that] wherein said sensor [(10)] and said processing circuit [(20)] are integrated in a single chip.

11. (Amended) System according to [any of claims 1 or 10] claim 1, [characterised in that] wherein said sensor [(10)] and/or said processing circuit [(20)] implement VLSI CMOS technologies.

12. (Amended) System according to [any of the preceding claims] claim 1, [characterised in that] wherein said processing circuit [(20)] is configured to perform on said signals corresponding to said images [(I)] at least one of the operations selected from the group consisting of:

- [-] background clearing [(201, 301)] of said images [(I)],
- [-] grid analysis [(202, 302)] of said images [(I)],
- [-] elimination of smaller irregular spots [(203, 303)],
- [-] elimination of the larger spots [(204, 304)],
- [-] intensity analysis [(205, 305)], and

[-] threshold definition [(206, 306)].

13. (Amended) System according to [any of claims 6 to 9] claim 1, [characterised in that] wherein said processing circuit [(20)] is configured to combine the processing results [(591, 592)] obtained in relation to distinct chromatic components [(R, G)] of said images.

14. (Amended) System according to claim 13, [characterised in that] wherein said combination operation is a logic product (AND – 40).

15. (Amended) System according to [any of the preceding claims] claim 1, [characterised in that] wherein said processing circuit [(20)] comprises:

[-] at least one analogue memory [(11)] for storing signals corresponding to said images [(I)] and

[-] a control logic [(13)] for running real time processing sequences of said images.

16. (Amended) System according to claim 15, [characterised in that] wherein said images and the intermediate processing stages are stored by at least one analogue memory [(11)].

17. (Amended) System according to [any of claims 15 or 16] claim 15, [characterised in that] wherein said processing circuit [(20)] comprises means [(15)] for storing the configuration parameters of said cellular neural network.

18. (Amended) System according to claim 17, [characterised in that] wherein said configuration parameters are stored in digital form and said processing circuit [(20)] comprises a digital/analogue converter [(14)] to convert said parameters to analogue form in order to be input to said cellular neural network.

19. (Amended) System according to [any of the preceding claims] claim 1, [characterised in that] wherein said processing circuit[.] [(20)] processes said signals

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corresponding to said images [(I)] by applying sets of parameters (templates) of the cellular neural network.

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